

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A method of ablating tissue within a body of a patient using an elongated flexible tubular member having at least one lumen and a distal end portion and an ablative device which is configured to be longitudinally received within said at least one lumen of said flexible tubular member, said ablative device having an energy delivery portion which is coupled to a source of ablative energy, the method comprising the steps of:

introducing said flexible tubular member into the patient's body and positioning the distal end portion of the tubular member adjacent to or in contact with an extended region of tissue to be ablated;

transluminally slidably positioning the ablative device through the at least one lumen of the flexible tubular member to locate the energy delivery portion at a first of a plurality of locations along the extended region at least partially within said distal end portion;

delivering ablative energy to said energy delivery portion and emitting ablative energy from said energy delivery portion in a direction transverse to a longitudinal axis of said at least one lumen to transmurally ablate said tissue region from within the tubular member along a length of the extended region about said first location, wherein a lesion formed by the transmural ablation forms an electric conduction block through an entire wall thickness of the tissue where the transmural ablation is performed;

transluminally slidably positioning the ablative device through the at least one lumen of the flexible tubular member to locate the energy delivery portion at a second of the plurality of locations along the extended region at least partially within said distal end portion and near the first location;

delivering ablative energy to said energy delivery portion to transmurally ablate said tissue region from within the tubular member along another length of the extended region about said second location; and

maintaining alignment of the ablative device and the at least one lumen relative to a rotational direction about a longitudinal axis of the at least one lumen, during said transluminally slidably positioning steps, by a cooperative configuration of the ablation means and the at least one lumen.

Claims 2-4. (Canceled)

5. (Previously Presented) The method of claim 1 wherein the flexible tubular member is

introduced through an opening made through the chest of the patient.

6. (Original) The method of claim 5 wherein said flexible tubular member is inserted through a partial or median sternotomy opening in the chest.

7. (Original) The method of claim 5 wherein said flexible tubular member is inserted through a thoroscopic opening in the chest,

8. (Original) The method of claim 5 wherein said flexible tubular member is inserted through a percutaneous portal access opening in the chest.

9. (Previously Presented) The method of claim 1 wherein said tissue region to be ablated is a tissue region located within or on an organ or vessel selected from the group consisting of a heart, a stomach, a liver, a pancreas, a kidney, an esophagus, an intestine, a uterus, a spleen, a prostate, and a brain.

10. (Previously Presented) The method of claim 1 further comprising positioning the distal end portion of the flexible tubular member adjacent to or in contact with an epicardium of the heart of the patient.

Claims 11-16. (Canceled)

17. (Previously Presented) The method of claim 1 further comprising:
forming a penetration through a muscular wall of the heart into an interior chamber thereof; and
advancing the distal end portion of the flexible tubular member through the penetration.

18. (Canceled)

19. (Previously Presented) The method of claim 1 further comprising:
forming a penetration through an outer wall of a hollow organ;
advancing the distal end portion of the flexible tubular member through the penetration; and
positioning the distal end portion of the elongated tubular member adjacent to or in contact with

a tissue surface of an interior wall of a hollow organ.

Claims 20-24. (Canceled)

25. (Previously Presented) The method of claim 1 wherein the ablative device includes a microwave ablation element.

Claims 26-27. (Canceled)

28. (Previously Presented) The method of claim 1 wherein the ablative device includes a radiofrequency ablation element.

Claims 29-30. (Canceled)

31. (Previously Presented) The method of claim 1 wherein the ablative device includes an ultrasound ablation element.

Claims 32-39. (Canceled)

40. (Previously Presented) The method of claim 1 wherein the ablative device includes a cryogenic ablation element.

Claims 41-69. (Canceled)

70. (Previously Presented) The method of claim 1 wherein said flexible tubular member comprises one or more electrodes coupled to said distal end portion of the flexible tubular member, said method further comprising:

sensing contact between the flexible tubular member and the tissue region to be ablated using said one or more electrodes.

71. (Previously Presented) The method of claim 1 wherein the step of providing a flexible tubular member includes providing the distal portion of the flexible tubular member with at least first

and second sections, said first section having a loop configuration sized and dimensioned to substantially encircle an opening to a pulmonary vein, and said second section extending from said first section and having a substantially longitudinal configuration.

72. (Previously Presented) The method of claim 71 wherein the step of providing a flexible tubular member includes providing the second section of the flexible tubular member with at least one electrode.

73. (Previously Presented) The method of claim 71 further comprising:
introducing the distal end portion of the flexible tubular member into an atrium of the heart such that the first section substantially encircles the opening to the pulmonary vein and said second section extends a short distance into the vein through the opening thereof.

74. (Previously Presented) The method of claim 73 further comprising:
sensing electrical activity within the pulmonary vein with said at least one electrode.

75. (Previously Presented) The method of claim 73 further comprising:
assessing the electrical isolation of the pulmonary vein by using said at least one electrode to attempt to pace the heart form with the pulmonary vein.

76. (Previously Presented) The method of claim 73 further comprising:
assessing the electrical isolation of the pulmonary vein by using said at least one electrode to attempt to monitor the electrical activation from the left atrium.

77. (Previously Presented) The method of claim 73 further comprising:
introducing at least one contrast agent through said at least one lumen of the flexible tubular member into the pulmonary vein.

78. (Original) The method of claim 1 wherein said distal end portion of the flexible tubular member includes at least one temperature sensor, said method further comprising measuring a temperature of the tissue region using said temperature sensor.

79. (Previously Presented) The method of claim 1 wherein said ablative device includes at least one temperature sensor, said method further comprising:

measuring a temperature from within the flexible tubular member at one or more locations within the tubular member using the temperature sensor.

80. (Previously Presented) The method of claim 1 performed using a guide sheath having a pre-shaped distal end portion and an introducer sheath having a distal end, the method further comprising the steps of:

introducing the introducer sheath into an interior chamber of the heart;

introducing the guide sheath through the introducer sheath to extend the pre-shaped distal end portion of the guide sheath a short distance beyond the distal end of the introducer sheath in a direction which is sufficient to direct the distal end portion of the flexible tubular member towards the tissue region to be ablated; and

introducing the flexible tubular member through the guide sheath to position the distal end portion adjacent to or in contact with the tissue region to be ablated.

Claims 81-82. (Canceled)

83. (Previously Presented) The method of claim 80 comprising: extending the introducer sheath into an interior chamber of the heart from a peripheral access vessel in the arm or leg of the patient.

84. (Previously Presented) The method of claim 80 comprising:

extending the introducer sheath into an interior chamber of the heart of the patient from a jugular vein of the patient.

85. (Previously Presented) The method of claim 80 comprising:

extending the introducer sheath into an interior chamber of the heart of the patient from a subclavian vein of the patient.

86. (Previously Presented) The method of claim 1 using a guide sheath having a pre-shaped distal end portion; the method further comprising:

introducing the guide sheath into an interior chamber of the heart to extend the distal end portion in a direction which is sufficient to direct the distal end portion of the flexible tubular member towards the tissue region to be ablated; and

introducing the flexible tubular member through the guide sheath to position the distal end portion adjacent to or in contact with the extended tissue region to be ablated.

Claims 87-88. (Canceled)

89. (Previously Presented) The method of claim 86 comprising:

extending the guide sheath into an interior chamber of the heart from a peripheral access vessel in the arm or leg of the patient.

90. (Previously Presented) The method of claim 86 comprising:

extending the introducer sheath into an interior chamber of the heart of the patient from a jugular vein of the patient.

91. (Previously Presented) The method of claim 86 comprising:

extending the introducer sheath into an interior chamber of the heart of the patient from a subclavian vein of the patient.

Claims 92-96. (Canceled)

97. (Previously Presented) The method of claim 1, wherein the tubular member includes a window portion comprising a removed portion of the side wall of the tubular member and wherein said ablative device comprises an ultrasonic ablation element.

Claims 98-99. (Canceled)

100. (Previously Presented) The method of claim 1, wherein the tubular member includes a window portion formed of an electrically conductive material and said ablative device comprises an RF ablation element.

101. (Previously Presented) The method of claim 1, wherein the tubular member includes a window portion formed of a dielectric material having a low loss coefficient at microwave frequencies and said ablative device comprises a microwave ablation element.

102. (Previously Presented) The method of claim 1, wherein the tubular member includes a window portion comprising a removed portion of the side wall of the tubular member and wherein said ablative device comprise a microwave ablation element.

103. (Canceled)

104. (Previously Presented) The method of claim 1, wherein the tubular member includes a window portion formed of a thermal conductor and said ablative device comprises a cryoablation element.

105. (Previously Presented) The method of claim 1, wherein the tubular member includes a window portion comprising a removed portion of the side wall of the tubular member and wherein said ablative device comprises a cryoablation element.

106. (Currently Amended) A method of ablating tissue comprising:

positioning a pre-shaped distal end portion of a guide catheter proximate to an extended region of tissue to be ablated of a body structure, wherein said distal end portion is devoid of openings through a wall of the catheter and comprises a bendable, shape-retaining member adapted to retain a pre-formed shape of said pre-shaped distal end by returning from a relatively straightened shape to said pre-formed shape when delivered out a lumen of a guide sheath;

transluminally slidably positioning an energy delivery portion of an ablative device through said guide catheter until said energy delivery portion is located within at least a portion of said distal end portion, said energy delivery portion adapted to be positioned at one of a plurality of positions within said distal end portion of said guide catheter and to emit ablative energy substantially radially from a longitudinal axis thereof through a contact surface of the guide catheter and along the extended tissue region; and

delivering sufficient energy to said energy delivery portion to ablate tissue along said extended tissue region through said distal end portion of the guide catheter, wherein a lesion formed by the

ablation forms an electric conduction block through an entire wall thickness of the tissue where the ablation is performed.

107. (Currently Amended) A method of ablating tissue within an interior chamber of a patient's heart, comprising:

providing a flexible tubular member having a distal end portion which is curvilinear to substantially conform the distal end portion to an extended tissue region about a vasculature opening within a chamber of the patient's heart, and wherein said distal end portion is devoid of openings through a wall thereof;

introducing the flexible tubular member into an atrial chamber of the heart and positioning the distal end portion adjacent to or in contact with the extended tissue region;

transluminally slidably positioning an energy delivery portion of an ablative device through said flexible tubular member, while maintaining rotational orientation of ~~preventing rotation of~~ said energy delivery portion relative to said guide catheter, until said energy delivery portion is at least partially located within said distal end portion; and

delivering ablative energy to said energy delivery portion to transmurally ablate tissue along said extended tissue region.

Claims 108-224 (Canceled)

225. (Currently Amended) A method of conducting a surgical ablation procedure on a heart of a patient using an ablation sheath comprising a proximal end portion, a distal end portion and at least one lumen that is not coaxially aligned with said ablation sheath, said at least one lumen having a radially asymmetric geometry ~~and a contact surface near the distal end parallel to a longitudinal axis of the ablation sheath, and an ablative device which is configured to be longitudinally received within said at least one lumen of said ablation sheath, said ablative device having an energy delivery portion which is adapted to be coupled to a source of ablative energy and emit ablative energy in a predetermined direction, the method comprising the steps of:~~

making at least one incision in a patient's chest to access the heart;

introducing the ablation sheath through said incision and positioning the contact surface of the distal end portion of the sheath adjacent to or in contact with a tissue surface of the heart;

inserting said ablative device through the at least one lumen ~~having a radially asymmetric~~

~~geometry~~ to locate the energy delivery portion of the device at least partially within said distal end portion of the sheath, and maintaining rotational alignment of said ~~radially asymmetric geometry of said at least one lumen preventing rotation of~~ said ablative device with respect to the ablation sheath during the step of advancing to orient the predetermined direction toward said tissue surface; and

applying tissue-ablating energy to said energy delivery portion for delivery from within the sheath to form at least one lesion of ablated tissue along the tissue surface of the heart, wherein said at least one lesion of ablated tissue includes ablated tissue at the tissue surface of the heart.

Claims 226-228. (Canceled)

229. (Previously Presented) The method of claim 225 further comprising:

forming at least one penetration in a wall of the heart into an interior chamber thereof; and

introducing the ablation sheath through the penetration to perform an ablative procedure within the internal chamber of the heart.

230. (Previously Presented) The method of claim 229 wherein the internal chamber is selected from the right atrium or the left atrium.

231. (Previously Presented) The method of claim 229 wherein the internal chamber is selected from the right ventricle or the left ventricle.

232. (Original) The method of claim 229 wherein said forming at least one penetration in a wall of the heart is performed using a cutting member on a distal end of the ablation sheath.

Claims 233-238. (Canceled)

239. (Previously Presented) The method of claim 225 further comprising:

performing at least one portion of a coronary artery bypass graft procedure prior to or after said formation of at least one lesion.

240. (Previously Presented) The method of claim 225 further comprising:

repeating said forming at least one lesion at least one or more times to form two or more

overlapping lesions on the heart.

241. (Original) The method of claim 225 wherein said distal end portion of the sheath is positioned adjacent to or in contact with at least a portion of the transverse sinus preparatory to treating atrial fibrillation.

242. (Original) The method of claim 225 wherein said distal end portion of the sheath is positioned adjacent to or in contact with at least a portion of the oblique sinus preparatory to treating atrial fibrillation.

243. (Original) The method of claim 225 wherein said distal end portion of the sheath is positioned adjacent to or in contact with at least a portion of the tissue connecting a pulmonary vein to the left appendage.

244. (Previously Presented) The method of claim 225 wherein said positioning the distal end portion of the sheath comprises puncturing at least one portion of the pericardial reflection.

245. (Canceled)

246. (Original) The method of claim 240 wherein at least a portion of respective ones of said plurality of lesions overlap one another to form a continuous lesion.

Claims 247-249. (Canceled)

250. (Previously Presented) The method of claim 225 wherein the ablative device includes a microwave ablation element.

251. (Previously Presented) The method of claim 225 wherein the ablative device includes a radiofrequency ablation element.

252. (Previously Presented) The method of claim 225 wherein the ablative device includes an ultrasound element.

253. (Previously Presented) The method of claim 225 wherein the ablative device includes a laser radiation emitting element.

254. (Previously Presented) The method of claim 225 wherein the ablative device includes a fluid delivery probe.

255. (Previously Presented) The method of claim 225 wherein the ablative device includes a cryogenic element.

256-281. (Canceled)

282. (Previously Presented) A method of ablating epicardial tissue around the pulmonary veins using an elongated malleable tubular member having at least one lumen and a distal end portion having a plurality of ablation positions, and an ablation device having at least one ablating element configured to be slidably received within the at least one lumen of the malleable tubular member, the method comprising the steps of:

manipulating the malleable distal end portion to create a desired shape of an ablation path;

positioning the distal end portion of the malleable tubular member in contact with a location on an epicardial surface of the heart near a pulmonary vein;

transluminally slidably positioning the at least one ablation device within the at least one lumen of the malleable tubular member until the at least one ablating element is located at a first of the plurality of ablation positions along the length of the tubular member; and

ablating tissue to form a lesion around the pulmonary vein with the at least one ablating element positioned proximate to the location on the epicardial surface to form at least part of the lesion around the pulmonary vein.

283. (Canceled)

284. (Previously Presented) The method of claim 282, wherein the step of ablating tissue comprises the step of forming transmural lesions around the pulmonary veins.

285. (Previously Presented) The method of claim 282, wherein the step of positioning the malleable tubular member comprises the step of encircling at least one pulmonary vein.

286. (Previously Presented) The method of claim 285, wherein the step of ablating tissue results in the creation of a continuous transmural lesion around the at least one pulmonary vein.

287. (Previously Presented) The method of claim 282, wherein the step of ablating tissue comprises the step of applying one or more ablative energies from the group consisting of: radiofrequency, ultrasound, microwave, cryogenic and laser.

288. (Previously Presented) The method of claim 287 in which the malleable tubular member is adapted to transmit the one or more ablative energies.

289. (Previously Presented) The method of claim 282, wherein the step of positioning the malleable tubular member comprises the step of encircling the pulmonary veins.

290. (Previously Presented) The method of claim 282, wherein the location on the epicardial surface comprises at least a portion of the transverse sinus.

291. (Previously Presented) The method of claim 282, wherein the location on the epicardial surface comprises at least a portion of the oblique sinus.

292. (Canceled)

293. (Previously Presented) A method of ablating epicardial tissue around the pulmonary veins using an elongated flexible tubular member having at least one lumen and a distal end portion having a plurality of ablation positions, and at least one ablation device comprising an ablation means, the at least one ablation device configured to be slidably received within the at least one lumen of the flexible tubular member, the method comprising the steps of:

positioning the distal portion of the flexible tubular member in contact with a location on an epicardial surface of the heart near a pulmonary vein;

transluminally positioning the ablation means with the at least one lumen of the flexible tubular

member until the ablation means is located at a first of the plurality of ablation positions at least partially within the distal end portion;

maintaining alignment of the ablation means and the at least one lumen relative to a rotational direction about a longitudinal axis of the at least one lumen, during said transluminally positioning, by a cooperative configuration of the ablation means and the at least one lumen; and

ablating tissue to form a lesion around the pulmonary vein with the ablation means positioned proximate to the location on the epicardial surface to form at least part of the lesion around the pulmonary vein.

294. (Previously Presented) The method of claim 293, wherein the ablation means comprises an energy delivery portion for transmitting ablation energy therefrom toward the epicardial surface during the step of ablating tissue.

295. (Previously Presented) The method of claim 294, wherein the ablation energy is one or more energies from the group consisting of: radiofrequency, ultrasound, microwave, cryogenic and laser.

296. (Previously Presented) The method of claim 294, wherein the energy delivery portion is an antenna and the step of ablating tissue further comprises the step of transmitting microwave energy.

297. (Previously Presented) A method of ablating cardiac tissue using an elongated flexible tubular member having at least one lumen and a distal end portion having a plurality of ablation positions, and at least one ablation device having at least one ablating element and configured to be slidably received within the at least one lumen of the flexible tubular member, the method comprising the steps of:

positioning the distal portion of the flexible tubular member in contact with a location on a surface of the heart;

transluminally positioning the at least one ablation device within the at least one lumen of the flexible tubular member until the at least one ablation element is located at a first of the plurality of ablation positions at least partially within the distal end portion;

maintaining alignment of the ablation device and the at least one lumen relative to a rotational direction about a longitudinal axis of the at least one lumen, during said transluminally positioning, by a

cooperative configuration of the ablation device and the at least one lumen; and

ablating tissue to form a lesion around at least one pulmonary vein with the at least one ablating element positioned proximate to the location on the heart surface to form at least part of the lesion around the at least one pulmonary vein.

298. (Previously Presented) The method of claim 1 wherein tissue ablated at said first location and said second location overlap.

299. (Previously Presented) The method of claim 1 wherein tissue ablated at said first location and said second location are continuous.

300. (Previously Presented) The method of claim 282, further comprising the step of:
incrementally advancing the ablation device at each of the plurality of ablation positions to form the lesion around the pulmonary vein.

301. (Previously Presented) The method of claim 225, wherein said at least one lumen is offset from a central longitudinal axis of said sheath.

302. (New) A method of ablating tissue comprising:
passing a distal end portion of a guide catheter along a lumen of a guide sheath and delivering said distal end portion proximate to an extended region of tissue to be ablated, wherein said distal end portion comprises a resiliently preformed shape that is deformed to a relatively straightened shape when passed through said lumen of said guide sheath and that resiliently returns to said pre-formed shape when delivered out of said lumen;

transluminally slidably positioning while maintaining rotational alignment of an energy delivery portion of an ablative device relative to said guide catheter until said energy delivery portion is located within at least a portion of said distal end portion, said energy delivery portion adapted to be positioned at one of a plurality of positions within said distal end portion of said guide catheter and to emit ablative energy substantially radially from a longitudinal axis thereof through a contact surface of the guide catheter that said energy delivery portion is aligned with and along the extended tissue region; and

delivering sufficient energy to said energy delivery portion to ablate tissue along said extended tissue region through said distal end portion of the guide catheter, wherein a lesion formed by the

ablation forms an electric conduction block through an entire wall thickness of the tissue where the ablation is performed.

303. (New) A method of ablating tissue comprising:

passing a distal end portion of a guide catheter along a tissue to be ablated, wherein the guide catheter has a predetermined contact surface extending along at least said distal end portion;

contacting said contact surface to the tissue to be ablated;

transluminally slidably positioning an energy delivery portion of an ablative device through a lumen of said guide catheter, wherein said energy delivery portion is automatically aligned with said contact surface as it is transluminally slid through the catheter, so that it is automatically oriented to deliver ablation energy toward said contact surface; and

delivering sufficient energy to said energy delivery portion to ablate tissue aligned therewith by contact of said contact surface.

304. (New) The method of claim 303, further comprising retaining a shape of said distal end portion by providing a shape retaining member extending longitudinally through said distal end portion adjacent said lumen.